Electricity on the Farm

A Monthly Magazine for the Progressive Rural Family

AUGUST 1930
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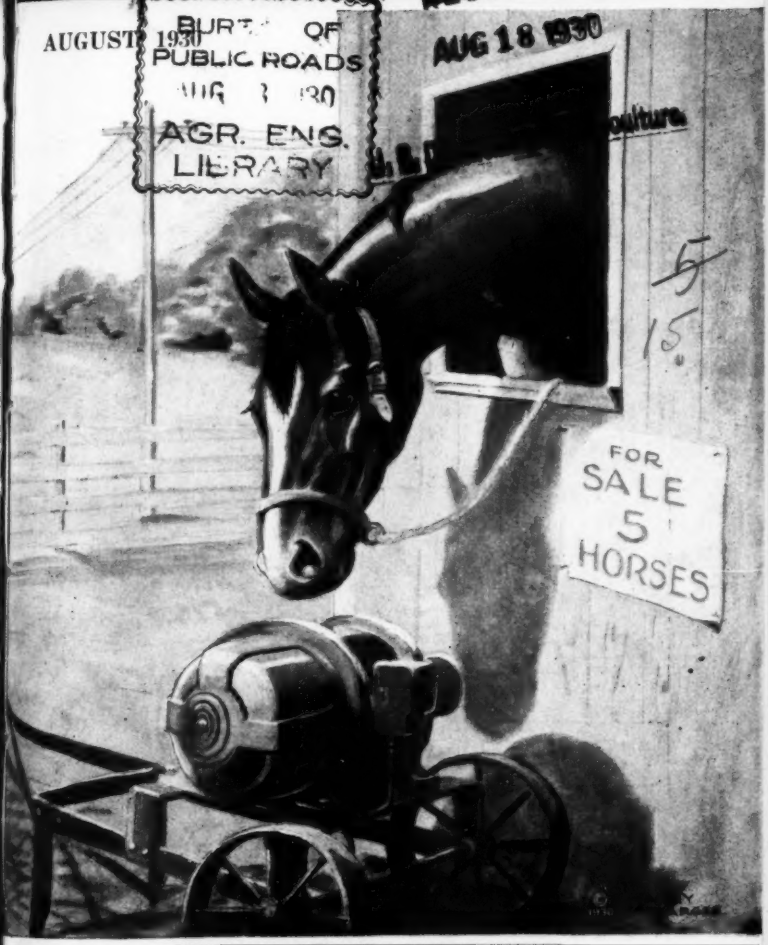

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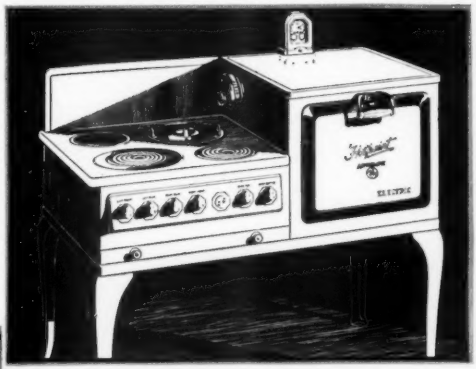

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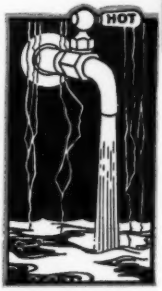

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GOULDS PUMPS

Electricity on the Farm

Vol. 3 AUGUST, 1930 No. 8

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Issued Monthly by
CASE-SHEPPERD-MANN PUBLISHING CORP.
(Successors to Farm Light and Power Pub. Co.)
Editorial-Executive Offices: 24 West 40th Street, New York
Western Office, 30 N. Michigan Ave., Chicago

KARL M. MANN, *President* — I. H. CASE, *Vice-Pres. and Gen'l Mgr.*
FRED SHEPPERD, *Editor* — K. H. GORHAM, *Advertising Manager*

Subscription price, 75 cents per year; single copies, 10 cents.

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TURN ON
When You Start Milking . . . . .
Have plenty of Boiling
HOT WATER
for washing-up when milking is done . . . . .

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a simple, practical and economical
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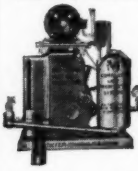
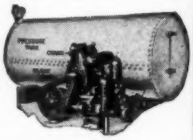
No. 2511 is for wells more than 24 feet deep—a complete, large capacity unit, suitable for large homes, farms, estates, schools, creameries, etc. Automatically controlled, self-starting, self-stopping, self-oiling. Operates from station current or farm lighting plant. If you want a reliable deep well outfit that will operate without attention, see this Myers plant.

Fig. 2524 is for wells 24 feet deep or more. No storage tank is required. It is completely automatic. The opening of a faucet anywhere along the line starts the pump, forcing fresh water direct from the well. Automatic air volume control. Belt driven. No attention necessary. Capacity range, 150 to 435 gallons per hour. Designed for operating with central station current or farm lighting plant.

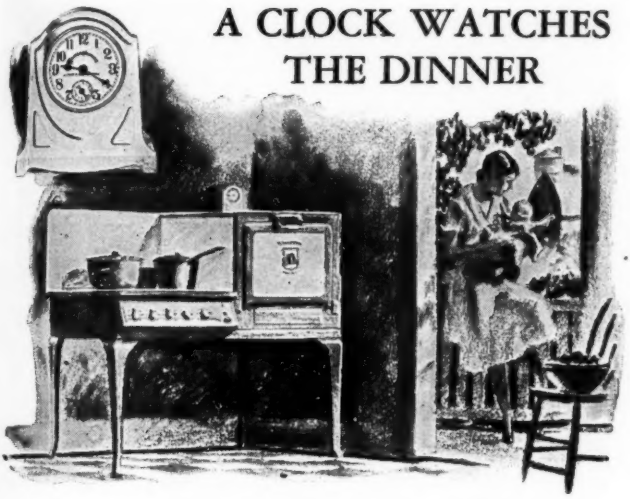


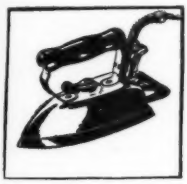
Myers Gas-Engine Operated Water Systems, built for either deep or shallow wells. Where electric current is not available, these engine driven pumping plants offer the ideal system. Starting pedal makes engine easy to start in any weather. When electric current arrives, replace engine with electric motor and you have an entirely automatic plant.

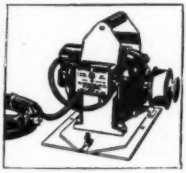


MYERS Self-Oiling Water Systems

A CLOCK WATCHES THE DINNER







and gives you time for other things

Crowding a day's duties into a day is often quite a problem — but there's an electrical answer nearly every time. A Westinghouse Automatic Electric Range, for instance, will relieve you of work and worry around meal-times — give you more time for sewing, cleaning, or tending to the children. That's because this range has a special time-clock feature in addition to providing clean, safe heat at the turn of a switch. Takes all the drudgery out of cooking. You can say good-bye to oil-can, wood-box and coal-scuttle. Get the facts from your local power company or the nearest Westinghouse dealer at once.

The Complete Farm Electrification People

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The WIRES *you never see...*

THE convenience and economy of electricity, your home servant, depend largely on the electric wires behind your walls. Only when the wiring is well planned—providing for handy wall switches and plenty of outlets—can you take full advantage of electric lights, floor lamps, irons, fans, and all the labor-saving appliances. *Electric service can go only as far as the wires that carry it.*

When the home and farm buildings are first wired—or when the wiring is extended—keep in mind that it doesn't pay to scrimp. Adequate, well-planned wiring costs little and soon pays for itself in the added comfort and saving of time and work.

The G-E Wiring System has been designed by experts to provide the greatest convenience and safety. Only materials of the highest quality are used. It permits the most economical and satisfactory use of MAZDA lamps and electric fans, vacuum cleaners and refrigerators, Hotpoint ranges and heating appliances, and every other electric device. And it can be the means of bringing you running water in the house and the dairy. Ask your power company about the G-E Wiring System.

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GENERAL ELECTRIC

Electricity on the Farm

Vol. 3 AUGUST, 1930 No. 8

Engineering and Agriculture

Too often we are inclined to overlook the work of the engineer in advancing the science of agriculture. And this applies not only to the mechanical or electrical engineer, but to the chemical engineer as well.

Many of the most revolutionary developments in agriculture may be credited to engineers identified with the various state agricultural colleges, as well as with the United States Department of Agriculture.

What the engineer has done in industry may well be taken as an example of what he may eventually do in agriculture. Without engineers we would not have automobiles in their perfect state, nor would we have modern farm machinery, which is accomplishing so much in reducing manual labor on farms. Without the engineer modern farm water systems, silage cutters and other equipment which means so much to the modern farmer would still be unknown.

Likewise, without the electrical engineer rural electrification could never be hoped for.

Modern farm machinery and methods are gradually reducing the importance of the hired man on the farm, and thus solving one of the most annoying problems the average farmer has to face.

While engineers are continually at work solving problems which may be encountered by agriculture in general, many problems arise which are individual to some particular farm. But here again the engineer can be of assistance. The state agricultural colleges have available a staff of trained men, fully informed on the various phases of agriculture, and upon these men farmers can call for assistance in handling problems which may arise. For assistance on the electrical problems, the farmer can utilize the rural service engineers of his power company with good effect. Practically all of the large power companies have on their staffs engineers who are familiar with farm problems and who can render real aid in ironing out difficulties incidental to the application of electricity to farming.

Make use of these men! Your state university and your power company are glad to cooperate with you, but it is up to you to call on them. You will find they can give you many valuable suggestions.

Electric Help

in Harvesting Hay

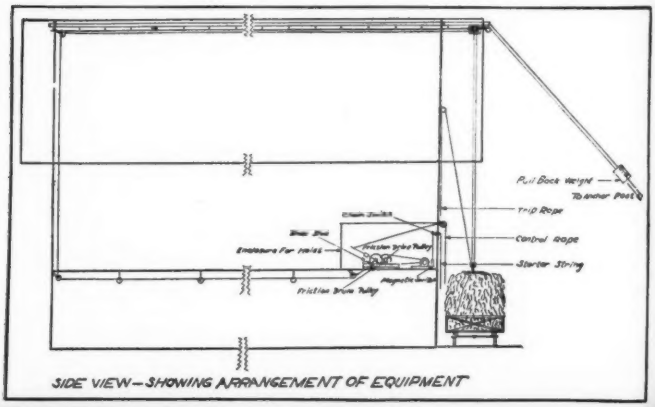
By Charles D. Byrne

THAT electric power may be efficiently and profitably employed in harvesting the 70 million acres of hay grown in the United States is the conclusion reached by experimenters at Oregon State college. Tests with electric hoists, carried on for several years on the experimental farm, indicate that at least one man and a team can be released for other work during the busy haying season by this method.

A recent bulletin on the experiment by F. E. Price, A. W. Oliver and E. L. Potter gives several other distinct advantages of the power method over the old horse method of pulling hay into a barn. In addition to the saving of a man and team in pulling up the loaded fork or sling, the electric equipment performs the task of pulling the empty fork back to the load. Thousands of hay makers throughout the country will utter a sigh of relief at this announcement because pulling back the fork has caused many a rope-burned hand and was the most disagreeable task in sticking a fork or setting a sling. In some instances, farmers rigged up devices so that a boy riding a horse could perform this task but it meant that much additional man and horse labor.

One Man Control

But labor saving is not the only advantage discovered in the study. Average figures taken in a large number of unloading tests show that the time of unloading is reduced by about four minutes per ton through the use of the electric hoist and pullback. Although it takes about 18 seconds longer to hoist the load by electricity, there is a saving of 31 seconds in setting the fork, six seconds in getting ready to pull back the fork and a 16-second saving in actually pulling the fork or sling from the barn to the load. A total saving of four minutes to the load seems small but four minutes is frequently a



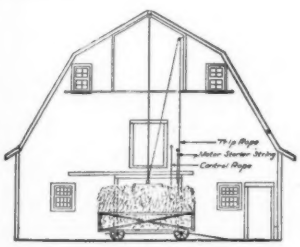
SIDE VIEW—SHOWING ARRANGEMENT OF EQUIPMENT

big factor in the busy haying season.

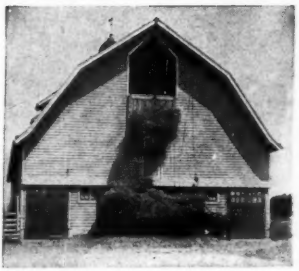
"How about the cost?" I hear you ask. Well, the initial cost of a good power hoist is from $80 to $100. Unloading costs per ton were found by the experimenters to be about one per cent per ton where electric power could be secured at three cents a kilowatt hour. Five horse-power portable motors were used in the experiment but Prof. F. E. Price, one of the men in charge of the test, believes that a three-horse-power motor would do the work. One year, 53.9 tons of hay were hoisted into the college barn at a cost of 54 cents for electricity. One Oregon farmer stated that it cost him $42 in man and horse labor in a single season to hoist his hay into the barn. This is quite a saving that could be applied each year on the cost of equipment.

A Time Saver Too

Control of the entire device is centered in the man on the load of hay. He starts the motor, which is located in the barn, by means of a rope operated from the wagon. A control rope to start the hoist or stop and hold the load at any point in its trip, is also operated from the wagon. The usual trip rope is employed the same as in a horse-drawn device. The safety of the workers is assured because control of the loaded fork is more certain than when drawn by horses. Merely releasing the control rope will stop the load at any point in its journey into the barn.



Front view, showing motor starting string and control ropes



Here is the apparatus in actual operation. Unloading operation is governed by the man on the load

Different arrangements of locating the hoist are possible. In one of the experimental trials, the equipment was located on the second floor of the barn at the unloading end. In another barn, the hoist was located on the ceiling of the first floor and the motor on the main floor. In the first case the operator could not see the hoisting equipment while in the latter he could see both the hoist and the motor as the hay was unloaded from the barn floor. The control in both cases operated the same and there appeared to be little advantage in having the equipment within the vision of the operator.

Drinking Cups for More Milk

Oscar Hammer, who retails milk in Eureka Center, Minnesota, has found that drinking cups in his barn have not only saved a lot of work, but have also greatly increased the milk production of his herd. Within two weeks in early spring, this had amounted to 15 gallons each day for the herd of 25 cows, as compared to the previous yield. He has observed that cows, like people, drink more often when the supply is convenient, particularly when eating. At least four pounds of water are required for each pound of milk produced, so that any increase in consumption of water is usually followed by correspondingly larger yields such as reported by Mr. Hammer.

How Much Current Does It Take?

Cost of Operating Farm Machines by Electricity Much Less Than Commonly Believed

By TRUMAN E. HIENTON*

IT has been said of some equipment "It is not the first cost but the upkeep that counts." Fortunately this statement can not be properly applied to farm electrical equipment. Over six years of work by experiment stations located at various state universities has shown the cost of electric energy to be very low for operating most farm equipments.

Certainly this cost is an item with which the purchaser of such equipment should be familiar. Lack of information has prevented the adoption of electric power for farm uses which would prove more economical than that derived from other sources.

A small motor will do its bit in keeping an edge on farm tools

*Associate in Agricultural Engineering, Purdue University, Lafayette, Ind.

Results obtained in the studies conducted by the state experiment stations have done much to give an exact idea of the amount of energy used for the various operations. In many cases, these results have been startling in their revelation of the low amount of energy consumed by various equipment. The work of a man or woman spent at various tasks has been shown to be worth as low as from 1 to 2 cents per hour, when compared to the cost of doing the same work with electric energy.

The common unit of electric energy which is used by power companies in rendering statements is the kilowatt-hour. This is equivalent to the use of 1,000 watts for one hour. Thus, twenty 50-watt lamps used for an hour will consume one kilowatt-hour. A rough guide which may be used for motors where they are loaded at their rated capacity is to consider that for each horsepower of the motor, a kilowatt demand will be experienced. For example, a one-horsepower motor used for an hour will use one kilowatt-hour, a ½-horsepower motor will use 0.5 kilowatt-hour, etc. These figures will vary with the load on the motor and with its type and construction but this figure will serve as a rough guide in estimating cost of operation where other figures are not available.

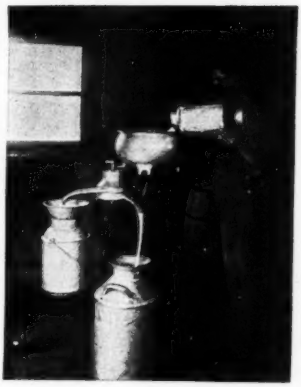
Due to the wide distribution of this magazine and the possibility of readers having different rates, the results which are included in this article are given in terms of kilowatt-hours for each operation. To determine the cost of doing any particular piece of work, multiply by your rate per kilowatt-hour

for that particular class of service, if any distinction is made in rates between heat, light, and power.

One of the most important uses of electric power on every farm is operating the water pump. A reliable supply of water is necessary on all farms and the ease with which electric power is automatically controlled makes it the most desirable type of power for this purpose. Tests conducted on four Indiana farms by the Purdue Station indicate that one kilowatt-hour will pump 700 gallons of water with shallow well pumps. The pressures in the storage tank varied from 20 to 40 pounds. Laboratory tests conducted at the same institution with water lifted 22 feet showed that under ideal conditions, one kilowatt-hour pumped 902 gallons at the same range of pressures. Results reported by Iowa State College in "Electric Service for the Iowa Farm" are that one kilowatt hour pumped 636 gallons with a 28-foot lift, and 470 gallons with a 59-foot lift.

Manufacturers of cream separators invariably recommend that their machines be turned steadily at constant speed. An electric motor which operates at constant speed is well suited to this farm chore. Tests indicate that one ton of milk is separated by one kilowatt-hour of electric energy.

Assisted by a motor, a young farmer can easily handle the feed grinding task



Separating milk with the aid of an electric motor on the Jersey Farm of R. C. P. Thomas, Bowling Green, Kentucky

The chief advantage of the milking machine lies in the saving of time and labor of hand milking. Electric power is preferred by many farmers for the operation of the milker because of its ease of starting under all weather conditions. One to three kilowatt-hours are required per month per cow milked, with the majority of the machines using from one to two kilowatt-hours per cow per month.

The definite value of grinding grain for dairy cattle was established by the dairy department at Purdue University through feeding trials. Similar feeding trials in progress by the animal husbandry department of the same institution show the desirability of grinding oats for the fattening ration of hogs and steers. Grinding grain on the farm often eliminates long trips to mill and avoids waiting for the grist. Where electric power is used to operate the grinder, a fresh daily supply of ground grain may be had without waiting until other power units on the farm are not in use, and may be used to drive the feed grinder. Tests of electric motor-driven hammer mills on Indiana farms by agricultural engineers from Purdue University indicate that one kilowatt-hour will grind 100 pounds of oats or 150

Sawing Wood with a 5 H.P. Portable Utility Motor

The Milking Task Simplified by the Aid of Electricity

Ensilage Cutter Driven by Motor Power on a Maryland Farm

pounds of shelled corn through a ⅛-inch screen. Further, that one kilowatt-hour will crush and grind 125 pounds of ear corn and oats through a ¼-inch screen mixed two parts corn to one part of oats.

The need for proper milk cooling is manifest particularly to the distributor whether he is the producer or buys the milk from the producer. In some instances Boards of Health insist on proper cooling on the farm, in other cases the company distributing the product may pay a premium for milk of certain grades to insure proper cooling. Refrigeration plants installed on dairy farms are becoming increasingly common, and solve the problem of cooling milk. Naturally these are driven by electric motors to facilitate starting and stopping either by hand or automatically. On an Indiana farm where a tank-type milk cooler is used one kilowatt-hour was used per 100 pounds of milk stored in the tank. On other farms where the milk is poured over a surface cooler partially filled with brine and then stored in a dry box, one kilowatt-hour was used to partially cool and then store 63 pounds of milk. In the case of the tank-type cooler precooling of the milk is accomplished by pouring it over a surface cooler filled with well water.

(*Continued on page 22*)

The electric soldering iron is of real value in the farm workshop

A Small 2 H.P. Motor Shells Corn and Grinds Feed for the Dairy Herd on the Farm of O. C. Hendryx, near Burlington, Ind.

Of What Value Is Electric Service *On the Farm?*

By J. C. Scott

AFTER successfully operating a dairy farm near Kent, Washington, for many years, Mr. and Mrs. E. J. Nelson decided to take a vacation and visit relatives living in another part of the Northwest, a very prosperous wheat farming country.

"Mother," said Mr. Nelson, the first day of their visit, "I never saw such wheat before in my life. The farms all look prosperous, too. And gosh! can you beat this climate! I think we had better cut our visit short, go back home, sell out and come back to stay. I sure would like to farm where stuff grows as it does here."

In relating this incident a few days ago, Mrs. Nelson admitted that she was not nearly so anxious to leave her home and go into that new rich country as Mr. Nelson was, "and the more he talked, the bluer I got; but I said nothing."

No Conveniences

"Why, do you know," she explained to the writer, "that when they wanted water, they had to go outdoors, pump and carry it into the house in a bucket. They washed in a basin and threw the water out the back door. To take a bath we had to heat water on the kitchen stove and bathe in a wash tub. For lights, they had only kerosene lamps and lanterns.

"All the time Mr. Nelson was talking about the wonderful country, I was thinking about the conveniences in our own home: electric lights, running hot and cold water, bathroom and kitchen appliances. We could never have these comforts where we were visiting because there were no electric lines built out to farms.

Value of Service Realized

"After a few days' visit my husband began to realize what it would mean to go without electricity on the farm again, as we did in the early days; and we came back home more contented than ever."

Mr. and Mrs. Nelson's experience brings out one side of the value of electric service on the farm, not only to the farm family, but also its importance to the development of a country. But, here is another side, which is often overlooked. It is the money-making value of electric service.

Besides an electric range, electric washing machine, electric dish washer, electric sewing machine, radio connected to the power line and other conveniences in the Nel-

(*Continued on page 36*)

Comparison of the Annual Cost of Milking 48 Cows by Two Methods

	By hand	By machine
Labor @ 50c per man hour	$2,160.00	$1,080.00
Electric current to operate machine		24.00
Interest on investment—$550 @ 8%		44.00
Depreciation on machine, 10%		55.00
Maintenance, oil, tubing, etc.		60.00
Total	$2,160.00	$1,263.00

Extra Profits from Wired Power

By E. R. Meacham

YOU come upon the farm shortly after you leave Clintonville, driving west on County Highway D. The 120 acres stretch out wide and fertile on both sides of the road. The neat, well-kept farm buildings are at the right. Around them spread fields of alfalfa and oats, pastures for a fine herd of Holsteins, corn for the silo and wheat and barley for the hogs and chickens.

For though Leonard Hitzke milks quite a string of cows, he does not rely entirely upon his milk check for his farm profits. He keeps enough hogs to swell his income appreciably,—and chickens are such an important part of the business that they can scarcely be called a side line.

I went out to the Hitzke farm to—well, you know why I went out there, I am like the minister who always preaches about baptism. You remember him, perhaps, Sunday after Sunday, all year long, he gave ardent, enthusiastic sermons on baptism. He preached well and his parishioners loved him, but they did get tired of hearing him talk only about baptism. So they got their heads together and hit upon the scheme of asking him to preach a series of request sermons on texts they themselves would pick out. He, flattered and delighted, agreed readily. They selected for the first text the first verse in the Bible. That seemed safely removed from the subject of baptism.

Sunday morning came; the service began. In due course the minister rose and announced the text. "In the beginning God created the heaven and the earth."

"Now the earth," he proceeded, "is one-fourth land and three-fourths water, which brings us naturally to the subject of baptism."

And so with me. No matter what subject I start on, I am soon talking about electric service for the farm. No matter where I am or which way I go, I am looking for the farmers who are making practical and profitable use of the service. So that is why I went out to talk to Leonard Hitzke.

"We use it in the house to wash and iron our clothes," he said. "My wife makes our toast and coffee with it, and we hitch the radio to the electric wires for entertainment."

"Those things certainly make easier, pleasanter living," I agreed. "But I am particularly interested in the way electric service helps you operate your farm. Does electric power do any important part of your work?"

A Great Helper

"You'd think so if you had to do all the work my 7½ H. P. motor does for me. For one thing it grinds all my home grown feed, saving me the job of hauling it off the farm and back again."

He does this with a small hammer mill that stands in a feed room convenient to the mangers. Here he grinds and mixes his ration in one operation by putting oats or barley and corn with a commercial dairy feed through the mill in the proper proportions. The grinding process mixes them thoroughly, and the mixture is blown into a tight feed bin. He shovels it into his feed cart from an opening at the bottom of the bin.

Mr. Hitzke does not grind roughage of any kind for his dairy herd, but when he wants some alfalfa meal for laying hens or brood

sows, he puts a little of his own hay through this same mill.

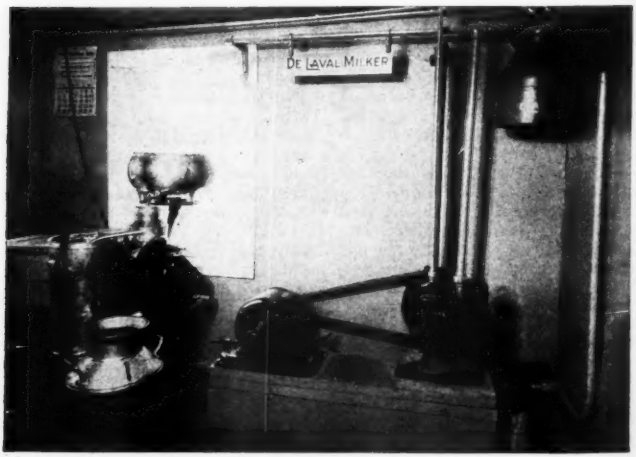
Last year at threshing time Mr. Hitzke made that same motor carry the grain away from the machine and put it in overhead bins. He used his silo filler as the elevator, setting it up so that his blower pipe, and what he could borrow from a neighbor, would reach the bins upstairs in the barn. The threshing machine stood close enough to the silo filler to let the bagger spout reach it and deliver the grain right into the fan housing. The motor running the filler blew the grain up into the bins as fast as it was threshed.

A Labor Saver

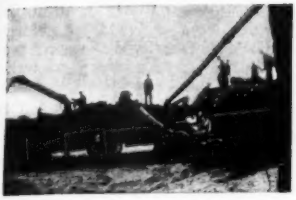
"Even that little job saved the labor of about five men," Mr. Hitzke told me. "We haven't a very big job of threshing but storing grain upstairs takes a lot of labor while it lasts. And if you're going to have a hammer mill set up right, so the grain will flow down into it, you've got to have your storage bins upstairs. The machine and crew came to do my job late in the afternoon, but the hired man and I went to milking as usual, and let that motor carry up the 500 bushels of grain."

During the summer the same motor runs the hay hoist that lifts the hay in the barn. By using the motor driven hoist, a side delivery rake and a hay loader, Mr. Hitzke handles forty acres of alfalfa with a haying crew consisting only of himself and his hired man.

"When we are making windrows with the side delivery, we cut the corners on the first round so the windrows turn in easy curves that we can follow with the loader. Then when we start to haul, both of us may go out together for the first load or so, but when we put one horse on each side of the windrow, they soon learn to go without driving. At the barn I set the fork and handle the hoist, and the hired man goes in the mow, but I can shoot it up to him so fast that he hasn't a chance to get one forkful leveled off before the next one drops beside him. So I leave him right there to tussle with it while I go back to the field for another load. You see my horses are already hitched to the wagon, and they've had a little rest while the motor was working, so I can hustle right back to the field and hook onto the loader



Milking and Separating Are Motor Jobs in This Neat Dairy.



The motor driven silo filler put the grain upstairs without help from anybody.

again. If the man up in that hot haymow gets all that alfalfa spread out before I get back, he's surely earned a little breathing spell."

With this mechanical help for loading and unloading, Mr. Hitzke has put in eleven loads in one day.

"I think a motor driven hoist is cheaper as well as quicker," he commented. "Even if we did have extra horses, we'd have to have extra help to drive the horse on the hay rope."

Besides this 7½ H. P. portable motor, there is a small one for ordinary hand-power jobs. He puts it on the fanning mill to remove the weed seeds from every bushel of grain he plants. Two years ago he had a surplus of about 600 bushels of oats for sale. So he carefully cleaned them with this motor driven fanning mill and sold them for seed at 15 cents a bushel over the market price. The extra money from this one job was more than enough to pay for a fanning mill, a motor to run it, and the electric current it took.

In any live stock farming the daily chores are an important part of the farm work. For much of this work electric power is a cheap substitute for man labor. Mr. Hitzke uses a 1½ H. P. motor for the milking machine. He has another small motor on the cream separator. An electric jack pumps the water to drinking cups in the barn and to the tank in which he cools his milk. The motor that runs the fanning mill is also used for clipping the cows.

"I clip them every six weeks in the winter time," said Mr. Hitzke. "because it keeps them cleaner and makes them look better. That motor takes the place of one man. What was before a two-man job is now just as easy for one."

"And how does electricity fit your poultry program," I asked.

"Besides grinding our feed and pumping our water, it lights the laying house in winter, warms the brooders in the spring, and provides night lights while the chicks are growing. Come and see my brooder," he concluded, starting off.

Instead of the usual round or square cone shaped canopy, here was one of the new battery brooders, five stories high, made entirely of metal and mounted on big casters so that it can be easily moved about. Each tier or story is divided across the middle into two square sections, and each of these is warmed by a 100 watt heating element. The temperature is controlled by a thermostat and each heating element can be plugged in or disconnected independently. This is an advantage because during mild weather the heat from below usually keeps the upper floors warm enough.

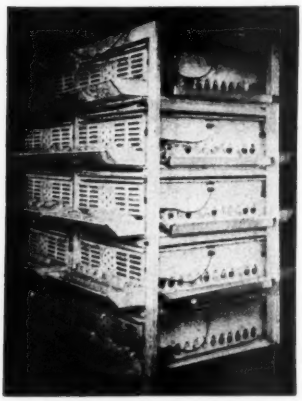
When the chicks are very small, each section will perhaps hold a

In this temporary installation Mr. Hitzke must fill the hopper. Later he will have spouts from overhead bins.

hundred chicks making it possible to start a thousand chicks in a floor space not much larger than a kitchen table. Mash, water, and buttermilk troughs are attached on the outside of each story all the way around. The water is supplied in a narrow trough extending through the center of the mash tray, so that the chicks as they thrust out their heads to eat dry mash, can also drink without running from place to place. They cannot get into the feed; they spill very little of it; and they cannot pick up any that is not in the trough, for the floors of the brooder are made of heavy wire netting with a tight metal tray a couple of inches beneath. Mr. Hitzke keeps these trays covered with paper so cleaning the brooder is largely a matter of taking out the soiled papers and putting in fresh ones.

A few inches in from the outer edge all around there is a muslin curtain that shuts in a snug warm place in each compartment. The chicks run in and out under that curtain just as they do in an ordinary hover on the floor.

This particular brooder stands in the same room with the coal burner that heats the water for the dairy. So twice a day there is a fire for an hour or so. When the first batch of chicks were put in, Mr. Hitzke kept a fire a little longer each night to give them extra warmth, but when I was there late in May, he had quit that for the electric elements gave him more than enough.



The new 5-story brooder that raises a lot of chicks in a little space

"We get along better with it than we did the old way," he said. "It's a lot less work, and our losses for these two broodings have been only about 5%. That is certainly low. I think perhaps it is because we can maintain much better sanitation. They just can't get any contaminated feed, and they never come in contact with the droppings."

"How long can you keep chicks in a brooder like that?" I asked.

"I kept that first batch there until they were a month old. Then we put the cockerels into a separate pen and began feeding them for the market. They are between five and six weeks old, and about ready to sell. The local market will take part of them, and some will go to the city trade.

We get better growth by keeping lights on in the brooder house all night. The chicks sleep awhile, get up and eat a little and sleep again. If it gets a little cool, the light prevents crowding. In a lighted house, they will scamper about, but if they get cold in the dark, they'll pile up."

For egg production Mr. Hitzke keeps a flock of about 650 layers. Most of them are pullets, but he keeps about 200 hens of his own select strain to produce eggs for hatching. To get more eggs when prices are high, he lights the laying house well. The lamps are turned on every morning at five o'clock and off at daylight. They are turned on again at four thirty in the afternoon and left on till seven. Mr. Hitzke ships his eggs directly to Milwaukee. With a farm flock of this size, he is able to produce enough so that the premium he gets is an important addition to his poultry income.

Thus modern methods and electric service, intelligently applied, are providing satisfaction and success in a well rounded farm business.

Mr. Sarber's Side Line of Concrete Work Was Made Profitable by the Employment of Electricity

Increasing the Income *from* Farm Labor

By J. F. Hixon

MR. I. E. Sarber, a cotton farmer near Elmore, Alabama, has developed an interesting and very satisfactory way of utilizing his time for profitable labor at certain seasons of the year. Several years ago Mr. Sarber began making concrete burial vaults, stone monuments, building tile and other concrete products for his neighbors. In 1925 an electric line was built along the highway in front of Mr. Sarber's home. He immediately began an expansion of his concrete industry through the use of electric power to make his labor more productive, increase his output and reduce the cost of production. He installed a motor-driven water pump, another motor for the concrete mixer, electrically operated equipment to polish the concrete products, and a motor driven air pump for a pneumatic hammer used to letter the vaults and monuments.

At first there was not a sufficient market for the concrete products to keep Mr. Sarber busy all of the time that his labor was not needed in the cotton field. Now, however, the local demand has so increased that the concrete industry is operated throughout the entire year. On a rainy day, or at any time when the farm help are not needed in the field, they can be used profitably at the concrete work. Thus, the industry increases the income from the farm labor. It also results in convenience and saving to the neighboring farms. Its effect in the community is very apparent to anyone driving through. The concrete tile and brick farm buildings, concrete flower urns, posts, steps and other such products are attractive and indicate permanence and stability.

Mrs. Sarber is no less enthusiastic than her husband over the benefits of electricity, and an inspection

Electric service is secured from the high line which passes the Sarber home

of her attractive rural home discloses a good reason for her feeling. She has the full convenience of running water, an electric range, and a washing machine. An electric refrigerator enables her to forget forever the old troubles with ice. A small electric heater makes her bath room a place of cozy comfort during the cold weather, and any part of the house is a refuge from the heat of summer with the firm breeze of electric fans making each easy chair a place of real rest. Numerous small appliances add the complete comfort offered by an electrified home, and Mrs. Sarber is high in her praise of all of them. Even the lawn mower is driven by an electric motor.

Mr. and Mrs. Sarber are, of course, justly, proud of their farm home, and are very enthusiastic as to the value of electricity in the development of farming communities and in the improvement of farm conditions. Mr. Sarber believes there are many other places where similar plants can be operated with profit to the farmer and great advantage to the community. This and many other small industries on the farms would prove of material benefit in many ways.

Applicant: "Here is my diploma in public speaking."

Employer: "Very well, go out in the other room and address those envelopes."

How Much Current?

(*Continued from page* 15)

It may well be said that the electric incubator and electric brooder are striving to become foster parents of baby chicks. Many large hatcheries use only electrically heated and operated incubators. Farmers who hatch their own chicks are learning to use small electric incubators. Tests on several 150-egg machines conducted by Purdue University agricultural engineers showed an average use of slightly over one kilowatt-hour per day.

In the state of Indiana many new electric brooders were placed in operation during the 1930 brooding season. The amount of current used by these brooders varies widely with the time of year, capacity of brooder, and method of handling the brooder. However, figures secured on four Indiana farms during 1929 indicate that where chicks are started in an unheated colony brooder house in April, that one kilowatt hour will brood from two to ten chicks for a period of 42 days.

The figures mentioned in the preceding paragraphs do not mean as much alone as they do when compared with other methods of doing the same work. The author wishes to suggest to every reader that a careful comparison be made with costs of doing the same work with other types of energy in order that the true significance of these figures be understood.

A never-tiring assistant is this little motor as it turns the grindstone

Surface Irrigation on Eastern Farms

By Chas. E. Seitz

MR. B. G. LOCHER, a Virginian farmer, has demonstrated that surface irrigation when intelligently practiced will result in increased crop yields. He said to me:

"My crops have suffered materially from the lack of sufficient water during the growing season in four of the eight years that I have farmed this land. Irrigation would have made possible a good crop and have paid me well these four years and I feel that I could have irrigated to advantage during the other years also."

Seasons of deficient rainfall and droughts of more or less severity have been experienced by most farmers. In such seasons farmers have prayed for some means of supplying water to their crops. In fact there are few seasons, even in the humid sections of the United States, that sufficient moisture is not lacking at some period during the growing season.

Secure Maximum Yield

Watering the crops by surface irrigation in seasons of general drought will often enable the farmer to secure a maximum yield when prices are high. Usually during seasons of drought when crop yields are generally low, prices are high and it is during such years that the farmer who is able to irrigate his crop will reap handsome profits.

Supplying sufficient water to any crop at the critical point in the growth of the particular crop, will often result in greatly increasing the yield and thereby justifying an investment in a pumping system. Electricity is an ideal source of power for pumping water for irrigation. As electricity is rapidly increasing in use on the farms of the East and since there are many eastern farms on which surface irrigation could be practical, an increased interest in irrigation throughout the East can be predicted.

Overhead or spray irrigation is already being used quite extensively in the trucking sections of the East. The high installation costs of overhead systems, however, prohibit the general use of such irrigation on any but high priced truck crops. Surface irrigation is simpler and much less expensive.

First Test in 1926

Mr. Locher, who operates a farm in Rockbridge County, Virginia, first tried irrigation on an alfalfa field in 1926. That year was dry and promised to be disastrous to his alfalfa crop. On his second cutting of alfalfa which had no water the yield was only 400 pounds per acre. In order to save the next cutting from a complete loss he connected his tractor to a six-inch centrifugal pump and pumped water from the river adjoining his field, flooding it over as much of the alfalfa as could be reached. Following the harvesting of his 1926 alfalfa crop, Mr. Locher wrote me:

"One good irrigation was made for the third cutting of alfalfa and in addition it received one good rain and two showers. The yield on the irrigated portion, for the third cutting was 2,150 pounds per acre and on the unirrigated portion only 1,204 pounds per acre. The indications are that had the second cutting received two irrigations, the yield would have been increased from 400 to at least 2,000 pounds per acre. Approximately 20 acres were irrigated for the third cutting with splendid results.

"My records show that the cost per irrigation did not exceed $3.00

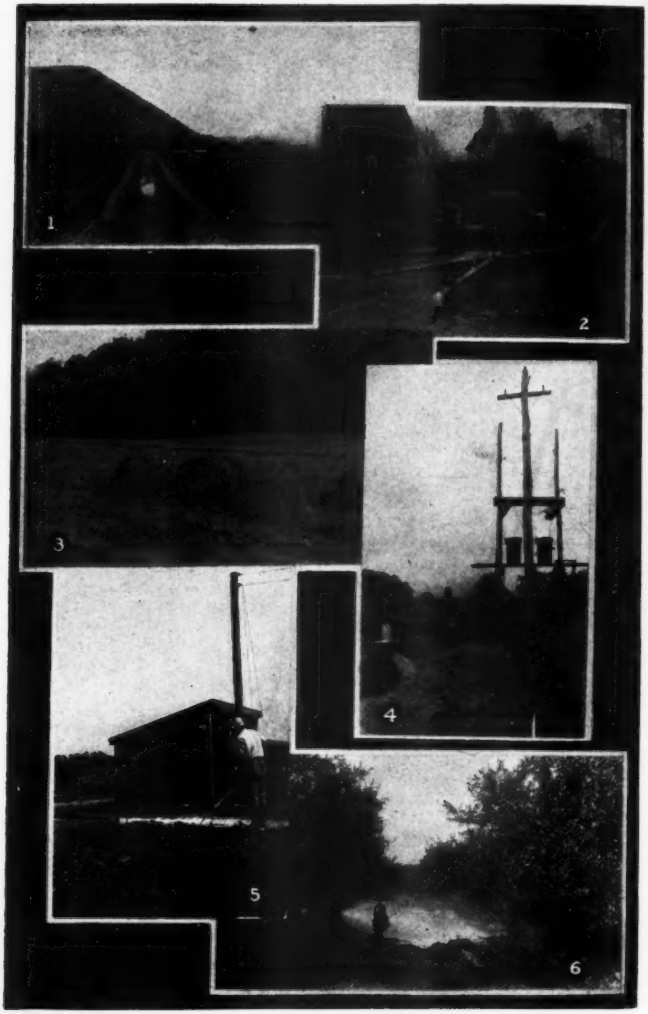


Photo No. 1. In 1928 several acres of potatoes were irrigated on the Locher farm; 2, The pumping unit used on an experimental plot of the Eastern Shore Branch of the Virginia Truck Experiment Station; 3, Unwatered alfalfa that received one good rain and two showers yielded 1284 pounds per acre. For the second cutting there was no rain. The average yield on this fie'd of 30 acres was 400 pounds per acre; 4, Distribution ditch on the Locher farm; 5, Irrigation of sweet potatoes during experimental period; 6, Irrigation distribution hydrants in a Virginia apple orchard. A 50 H.P. motor direct connected to a 6 inch centrifugal pump forces water through 2500 feet of 8 inch pipe against a head of about 100 feet to irrigate 60 acres of orchard

Driving a well for irrigation on experimental plot

per acre. For two irrigations the cost would be $6.00. For the $6.00 we would receive not less than 1,500 pounds of hay. The present market value after deducting harvesting and baling charges would be not less than $16.00. On this basis the net return per acre for four cuttings would be not less than $40.00, which is the interest on a valuation of slightly over $650.00 per acre. After I work out my distribution system, I feel sure that I can materially reduce the $3.00 per acre irrigation costs."

A permanent pumping plant, consisting of an 800 gallon centrifugal pump operated by a 15 H. P. motor was installed by Mr. Locher in 1928. This plant is located a few feet above the high water level on the river bank and pumps against an actual head of 18 feet. From this central pumping plant water can be distributed through earth main ditches to reach at least 30 acres. The approximate cost of the pump, transmission line and transformers was $1,000.00

Several acres of potatoes were irrigated by Mr. Locher during 1928. A check was made on one acre to determine the results. The potatoes were planted April 5th and harvested September 18th. Four applications of approximately 2 acre inches per irrigation were made during June and July, which were dry months. Only 2.04 inches of rain fell during April, May and June and 4.30 inches during July. August and September, however, were very wet months, averaging about 8 inches of rainfall each month. The irrigated plot yielded at the rate of 385 bushels per acre, while the check plot which was left unirrigated only yielded at the rate of 231 bushels per acre. A gain therefore of 154 bushels per acre was secured by watering the crop during the period of drought.

Potato irrigation studies have also been conducted on the Eastern Shore branch of the Virginia Truck Experiment Station for the past two seasons. On the small test plot under irrigation in 1928 the potato yield was increased at the rate of 47 bushels per acre by three irrigations. This increase was secured during a season of favorable rainfall. During the 1929 season, which was dry during the early growing period, the increase in favor of irrigation was at the rate of 123 bushels an acre. These experiments have shown that it is essential that potatoes receive sufficient water during the budding or blooming period. This seems to be the critical period of growth. If the crop des not secure sufficient moisture during this period the yield is greatly reduced.

The cost of surface irrigation in humid sections will vary considerably, depending on local conditions, such as source of supply, contour of land, method of distribution or whether the water can be secured

A 15 H.P. motor irrigates about 30 acres through plowed ditches

by gravity or has to be pumped. The biggest item of expense, however, will usually be the cost of installation, which may be only a few dollars per acre where the water can be secured by gravity and distributed through open ditches. With low pumping lifts and earth-ditch distribution systems the installation costs are usually comparatively low.

Study Conditions

An irrigation installation for surface irrigation may be too costly on some crops if the water supply has to be stored; if the pumping lifts are exceptionally high, or if it is necessary to bore deep wells and install deep well pumps. Careful study is necessary in determining the advisability of installing an irrigation system. As expressed in Farmers Bulletin No. 899, "Surface Irrigation for Eastern Farms":

"The operating cost of most furrow-irrigation plants in the humid sections is not great, as crops ordinarily need to be irrigated only a few times to carry them through periods of drought. The interest on first cost and the depreciation of the plant must be considered carefully, and often are the deciding factors in determining the feasibility of a pumping outfit. Yearly interest and depreciation of from 10 to 20 per cent is common; probably an average of 15 per cent would hold for most surface-irrigation plants.

"For example: If a plant cost $75 an acre to install, and the operating cost was $10 an acre per year, it would be necessary to add $11.25 for interest and depreciation, making a total yearly cost of $21.25. This would mean that the crops irrigated should yield a net profit of $21.25 per acre more than those raised on the same land without irrigation before any profit could be accredited to the irrigation plant. Water may be worth many times this amount for some crops and much less for others. Local conditions control allowable costs of irrigation to such an extent that permissible limits of construction expense cannot be given here."

The farm motor used to operate the pumping plant for surface irrigation is another of the many promising adaptions of electric power on the farm. Eastern farmers having suitable conditions for surface irrigation, who will put forth the proper amount of intelligent effort should be able to make this use of the farm motor pay good dividends in dry seasons.

Farmers interested in surface irrigation could profit by reading U. S. Department of Agriculture Farmers Bulletin No. 899, previously referred to. This bulletin explains the methods of surface irrigation, which are simpler and less expensive than either the spray or sub-irrigation methods.

Faulty Separators Lose Fat

More than $2,000 worth of fat has been left in the skim milk by faulty separators or careless operation during the first four months of the year among members of Iowa herd improvement associations according to reports of testers covering this period. Some associations have reported an average loss of $21 per member while in others there is no loss. Since these are checked each month and some effort made to remedy the trouble it is evident that the losses from the average would be tremendous.

In addition to worn out separators or those in which the bowl may be out of balance, losses may be due to flushing with cold water instead of lukewarm water and to lack of proper care. It has been found that losses of fat may be three times greater in separators which have not been washed after each use. If plenty of warm water is available there is no drudgery in washing the separator if done at once. If this is impossible, the bowl should be inverted in cold water until it is washed. The tinware should be carefully dried especially when the separator is new. Spots of rust on the disks make cleaning more difficult and result in some loss of fat.

Current Cools the Milk

By J. F. SCHAENZER*

AS the demand for high quality in a product increases, it naturally raises the cost of producing the article, and may decrease the profit for the producer. But in 1922, a well known dairy products company of Chicago, decided that there was a profitable market for a high quality fluid milk which would sell at an advance in price in Chicago and its suburbs.

After looking over numerous locations, the dairy company decided to locate their plant at Lake Geneva, Wisconsin, because there was a natural abundance of ice as well as many good dairymen. Mechanical refrigeration of milk was not in use at that time and as the company insisted that the milk be delivered at a temperature of 50 degrees Fahrenheit, the use of ice and the building of ice houses became a necessity.

The building of the ice house, cooling the milk, the extra precautions and additional work required to obtain high quality, increased the cost of production. To compensate the farmer for these added expenses, the company pays a premium of forty cents per hundred pounds, if the bacteria count does not exceed 10,000 per cubic centimeter. There is a 25 cent premium per hundred pounds if the bacteria count is between 10,000 and 25,000 per cubic centimeter and no premium if it exceeds 25,000. Two bacteria counts of the milk are made each week and averaged.

*Project Leader, Wis. Committee on the Application of Electricity to Agriculture.

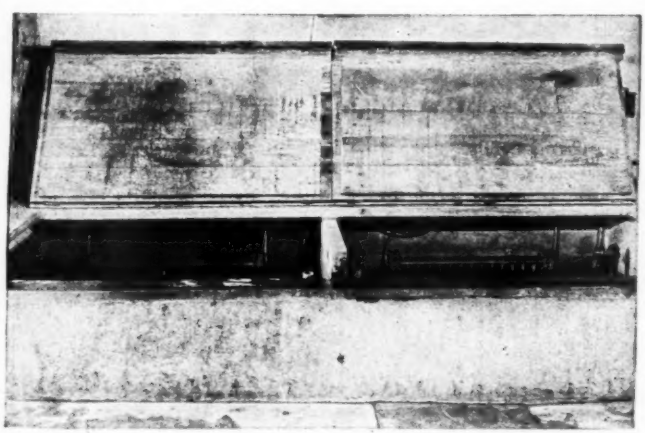


Fig. 1. Two compartment wet storage dairy refrigerator. Radiators are used in place of the usual coils

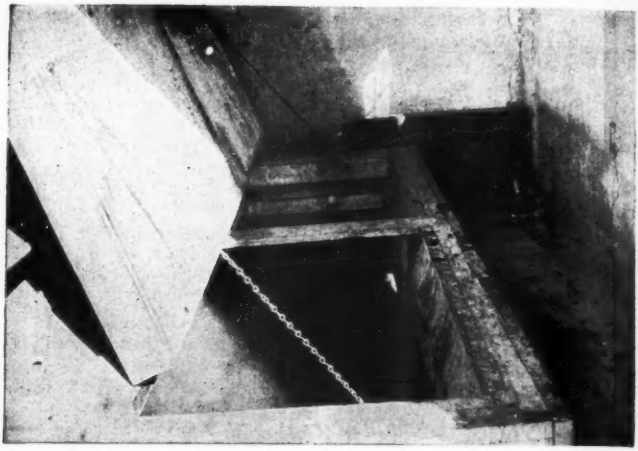


Fig. 3. A twelve can wet storage dairy refrigerator. The cooling coils are placed around the inside wall of the tank and protected from injury with wooden slats and sheet metal

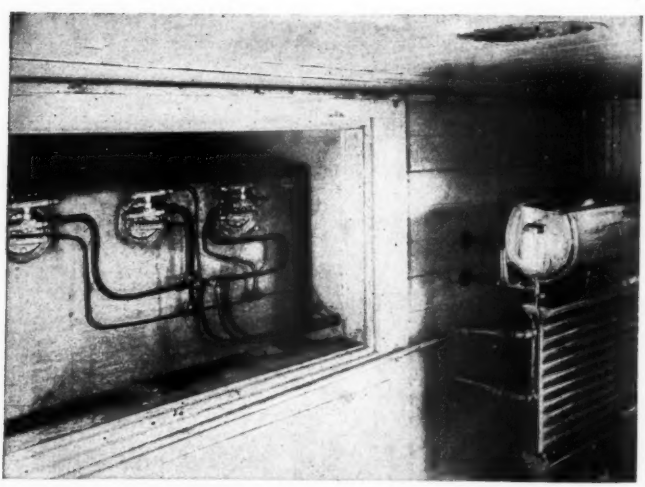


Fig. 6. Brine tank of dry box and aerator. A door thirty inches high enables one to place the cans or cases of milk in the refrigerator

The company assists the dairymen in the production of quality milk by employing a full time veterinarian. All herds furnishing milk are tested annually for tuberculosis. If any reactors are found, the herd is retested every six months until they are found to be free of the disease, when the annual policy is again adopted. At regular intervals each animal is given a physical examination including the heart, lungs, udder, and glands. If any diseased animals are found, they are immediately isolated from the remainder of the herd. The veterinarian also makes an inspection of the sanitary condition of the barn, milk house and the utensils used, and recommends necessary improvements. He may also suggest the use of more efficient and sanitary methods to improve the quality of the milk where the dairyman has difficulty in keeping down the bacteria count.

At the time this policy was adopted, approximately forty dairymen decided to build ice houses, improve their barns and milk houses, and deliver milk under this plan. Additional farmers have been added yearly, until the number reaches nearly 100 producers, to meet the Chicago demand for this high grade of milk.

Having ice on hand to cool the milk rapidly, keep down the bacteria count and thus receive the extra premium, became an essential in the production of this high grade of milk. The necessary ice houses cost considerable and deteriorated rapidly. Putting up the ice during the middle of the winter is usually considered a disagreeable job and costs considerable money. It is possible that one-third of the ice may be lost in storage by melting. Further losses will be encountered when using it. For these reasons, and perhaps due to a long warm fall, the supply of ice may be inadequate. In order to make the supply last it may sometimes be used too sparingly to give the desired results. The labor involved in getting it out of storage and using it is considerable. And milk requires the most attention

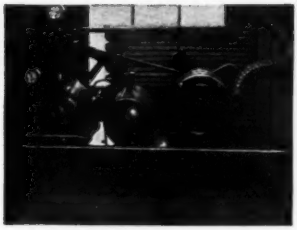


Fig. 4. An air-cooled compressor used for dairy refrigeration. It is placed in front of a window to aid its cooling and thus increase its efficiency

and labor during the summer months, when farm hands are extremely busy in the fields.

Because of the complexities, labor and expenses involved in the harvesting, storage, and use of natural ice, these dairymen were very much interested in the use of mechanical refrigeration. They were of the opinion that if dependable, automatic equipment could be purchased and installed, it would very materially decrease the labor and cost of operation.

Mr. Herbert White, rural service representative of the Southern Wisconsin Electric Company since merged with the Wisconsin Power and Light Company, did a great deal of valuable pioneer work in this development. Since the first

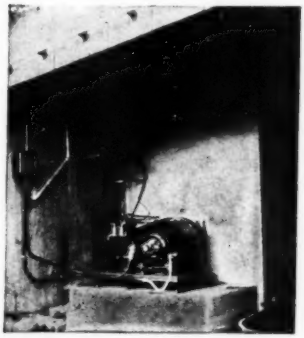


Fig. 5. Dry box type of dairy refrigerator and air-cooled compressor

electric milk coolers were set up about 4 years ago, he has kept records of energy used, methods of cooling and bacteria counts. There are now 45 electric dairy refrigerators in this territory and Mr. White has supervised the installation of many of them.

Two different methods of cooling are in use. These are often spoken of as wet (Fig. 1 and 3) and dry (Fig. 5) storage. One is a tank type which holds water cooled to a low temperature in which cans of milk may be submerged and the other is a dry box. If properly installed to meet the needs and requirements of the individual dairyman both give entire satisfaction.

The wet storage type is usually the more practical for the dairyman who sells milk in bulk, while the dry box and aerator best serves the retailer of bottled milk. Fruits, vegetables, meats and other perishables may also be kept in a dry box. The wet storage tank cannot be put to this use, but its initial cost, and the cost of operation is less than for the dry box.

Where a dairyman has large quantities of milk to cool both morning and night, the double tank (Fig. 1) is best. The water in the tank should come above the milk in the can when it is cooled. If the tank is too large, there will be only a small variation in the level of the water as a can of milk is placed in it, and this rise may not even be enough for the entire milk of one milking to give the best results. On the other hand too small a tank is not satisfactory.

Coil Installation Differs

Various methods of installing the coils used for cooling the tank are recommended by different manufacturers of milk coolers. Some concentrate all of the coil in a small space, others use the basket method by having the coil placed around the outside of the tank (Fig. 3), and one manufacturer uses cast

TABLE I

Dairy Refrigeration Tests—1927

These records were taken on four farms furnished central station service by the Southern Wisconsin Electric Company, Lake Geneva, Wisconsin. A great deal of credit is due Mr. Herbert White, in charge of the rural work, in securing this data in both 1927 and 1928.

Farm No.	Months used inclusive	No. of months used	Pounds milk cooled	Av. pounds milk cooled per mo.	Type of installation	Kilowatt Hour Consumption						
						Total used	Av. per mo.	Av. per 100 lbs.	High mo.	No. used	Low mo.	No. used
1	Apr. to Nov.	8	143,752	17,969	Wet	1303	163	.906	June	205	Nov.	92
2	Apr. to Nov.	8	145.964	18 245	Wet	1430	179	.979	July	232	Nov.	78
3	July to Oct.	4	95,559	23,890	Wet	955	239	.999	Aug.	286	Oct.	190
4*	July to Oct.	4	83,222	20,805	Wet	787	197	.946	Aug.	231	Oct.	166
Totals and Averages.....		24	468,497	19,520		4475	186	.955				

*This is a two compartment tank. Due to the smaller compartment the water for the evening's milk is left at a higher level which is more favorable for cooling the milk.

Data on Bacteria Count

Table giving the data on the bacteria content of the refrigeration units of the table above. A premium of 40 cents per hundred pounds of fluid milk is paid if the bacteria content is below 10,000 and 25 cents if between 10,000 and 25,000.

Farm No.	Av. bacteria count per week	No. of weeks below 10,000	No. of weeks 10,000 to 25,000	No. of weeks over 25,000
1	38,140	10	9	13
2	3,537	31	1	0
3	10.515	8	8	0
4	12,435	9	5	2

iron radiators similar to those used in house heating. (Fig. 1). Annular tubes may also be used.

It has been the experience of the dairymen who have the concentrated coils that they often freeze over entirely, thus greatly reducing the cooling area. The ice itself acts as an insulator, preventing the cooling of the water low enough, and there may also be a great variation in temperature between the water at the top and bottom of the tank. This difficulty may be overcome by the use of an agitator (Fig. 2). If this is operated in series with the compressor it prevents the forming of a large mass of ice on the coils. The temperature of the water will be more uniform as well as colder, oftentimes near freezing. The agitator will thus reduce the time of cooling of the milk about one-half.

Dry Storage

The dairyman who wishes to employ dry storage must erect an insulated dry box cooler (Fig. 5). A brine tank (Fig. 6) is located in the upper part of this cooler. The coils of the cooling equipment are placed in the tank and cool the brine to about 20° Fahrenheit. This cools the air in the box. In the smaller dry boxes, the tank occupies the entire upper space (Fig. 6). A door about thirty inches high allows the operator to place the cans or cases of milk in the lower half. Where a larger capacity is needed, a bigger box is constructed and the brine tank only

TABLE II

Dairy Refrigeration Tests——1928

These records were taken on six farms furnished central station service by the Southern Wisconsin Electric Company, Lake Geneva, Wis.

Farm No.	Months used inclusive	No. of months used	Pounds milk cooled	Av. pounds milk cooled per mo.	Type of installation	Kilowatt Hour Consumption						
						Total used	Av. per mo.	Av. per 100 lb.	High mo.	No. used	Low mo.	No. used
1	Apr. to Nov.	8	128,041	16,005	Wet	1121	140	.875	Aug.	210	Nov.	51
2	Apr. to Nov.	8	144,604	18,075	Wet	1449	181	1.002	Aug.	265	Nov.	91
3	Apr. to Nov.	8	255,214	31,902	Wet	1742	218	.982	Aug.	347	Nov.	52
4	Jan. to Nov.	11	184,344	16,758	Wet	1570	143	.851	July	250	Feb.	69
5	May 15—Nov.	5.5	148,859	27,065	Dry	1741	317	1.169	Aug.	442	Oct.	215
6	Aug. to Oct.	3	79,425	26,475	Wet	981	327	1.235	Aug.	435	Oct.	255
Totals and averages		43.5	940,487	21,620		8604	221	.915				

Note—The records of Farms No. 1 to 4 inclusive are from the same farms as those given under these numbers for 1927.

An aerator is used on Farm No. 5. The energy used for pumping the water is not metered nor included in the record.

Data on Bacteria Count

Farm No.	Av. bacteria count per week	No. of weeks below 10,000	No. of weeks 10,000 to 25,000	No. of weeks over 25,000
1	48,844	8	12	12
2	8,847	21	9	2
3	12,278	16	13	3
4	13,643	30	10	4
5	13,886	11	8	3
6	11,211	8	3	1

occupies a part of the upper space. In this case it is also possible to build a higher door enabling one to walk in. This is ordinarily known as the "walk in" dry box.

To Hasten Cooling

To hasten the cooling, the dry box is supplemented with an aerator or surface cooler (Fig. 6). The milk is poured into the tank above the aerator, then run over the cooling coils and again collected in a can below. To get the best results, the milk should flow over the aerator in a thin even film and not in streaks. The aerator is usually cooled by running cold water through the upper coils and brine through the lower part. This brings the temperature of the milk down to about 40° Fahrenheit, when it is ready for bottling or storage. To give satisfactory results, the water should run through the cooler about six times as fast as the milk flows over it. The capacity of the aerator is about ten gallons per hour for each six inches of length. With this equipment the evening milk is cooled with the aerator and stored in the dry box. The morning milk is only cooled by running it over the aerator and then delivered with the evening milk.

Either air or water may be used to cool the compressor. The air cooled compressor (Figs. 3, 4 and 5) is easier to install, simpler, easily made automatic in operation and not dependent upon a supply of water. The efficiency is lower because of slower cooling and it requires a larger motor. The air cooled compressor may be placed in front of a window (Fig. 4) in an opening in the wall, or even outside (Fig. 5) to increase its efficiency. In most cases, the air cooled compressor is recommended because it is less complicated, will not freeze up in the colder climates, and perhaps cause an expensive re-

TABLE III

Specifications of Dairy Refrigeration Installations

These units are located on six farms furnished central station service by the Southern Wisconsin Electric Company, Lake Geneva, Wisconsin. The numbers of these farms correspond with the dairy refrigeration tests for 1927 and 1929.

Specifications	Farm Number					
	1	2	3	4	5	6
Type of installation	Wet	Wet	Wet	Wet	Dry	Wet
Size of tank						
Length	7'6"	6'4"	10'0"	12'9'	5'0"	9'4"
Width	4'8"	3'4"	5'8"	3'9"	3'9"	3'9"
Depth	1'10"	1'10"	2'8"	1'10"	5'9"*	2'0"
Capacity in cans.	15	12	20	20	12	16
Kind of insulation	Cork	Cork	None	Cork	Cork	Wallboard
Thickness of insulation						
Sides	3"	2"	None	3"	3"	1.5"
Bottom	3"	1"	None	3"	None	1.5"
Ceiling or cover				10"	3"	1.5"**
Thickness of wall	8"	10"	7"	1.5	6"	8"
Motor Size—H.P.	1.5	1.5	1.5	1.5	1.5	1.5
Method of cooling compressor	Water	Water	Water	Water	Air	Air
Method of control	Automatic	Automatic	Manual	Automatic	Automatic	Automatic

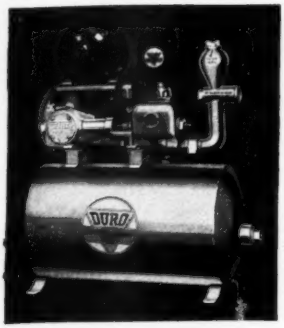
Notes: Farm No. 4 has a twin tank. The sizes of these are 6'9" x 3'9" x 1'10" and 6'0" x 3'9" x 1'10". These are separated by a 4" concrete wall.

On Farm No. 5 an aerator is used to aid in the cooling of the milk. Cold water is available and used to reduce the load on the compressor. The energy for pumping the water is not metered.

*The brine tank occupies the upper part of this dry box, leaving a height of 40" for the milk cans. The door of this unit is about 36" high.

On Farm No. 6, two 6" x 8" annular tubes are used to cool the tank.

**Two one-half inch boards are also used.



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pair job. Authorities claim that the compressor should not operate more than fifteen hours per day during the summer months.

During 1927 and 1928, records were kept on four and six dairy refrigeration units respectively in the Lake Geneva territory. This data (Tables I and II) gives detailed information on the pounds of milk cooled, number of months equipment was used, type of installation, kilowatt hour consumption and bacteria count. Specifications of the installations are given in Table III.

On Farm No. 1, a new milk house, including tank, was built at a cost of $300.00 at the time the mechanical refrigeration equipment was installed. The house is ten feet square and well constructed. During the two year period, a total of nearly 272,000 pounds of milk was cooled at less than .9 kilowatt hour per hundred pounds. The cost for energy was $39.03 in 1927 and $33.63 in 1928. Ice was used in 1926. This cost $118.00 stored in the ice house. This leaves a balance of about $80.00 in favor of electricity which goes a long way toward paying interest, insurance, repairs and depreciation on the cooler.

Records for the refrigeration of the milk on the other farms are very similar to those of Farm No. 1. The tank on Farm No. 3 has no insulation. The reason for the economical operation of this tank is perhaps due to the fact that it is located on the north side of a building and well protected from the heat of the sun. The energy consumption for Farm No. 6 is considerably higher than for the other four farms, being 1.235 kilowatt hours per one hundred pounds cooled. Two annular tubes, 6" x 8' are used to cool the tank and this may account for the additional energy consumption.

Farm No. 5 has a dry box and aerator. (Figs. 5 and 6). This is the equipment described earlier in this article. The current consumption for pumping the water through the upper half of the aerator is not included in Table II. A one-quarter horsepower motor is used on the brine pump. The aerator has a capacity of 425 pounds of milk per hour and the storage box a capacity of twelve cans. This farmer is producing nearly one thousand pounds of milk per day. The energy consumption is 1.169 kilowatt hours per one hundred pounds.

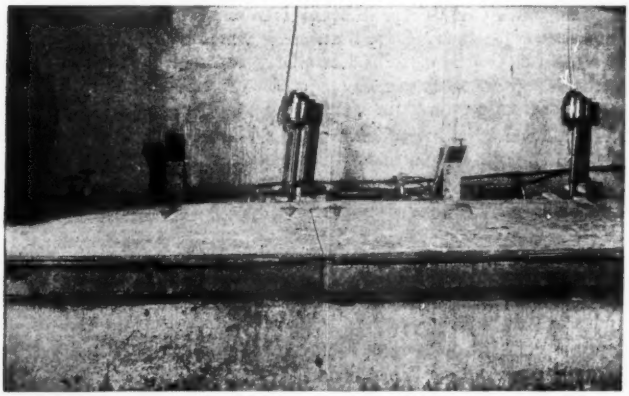

Fig. 2. An agitator driven by an electric motor is used in each compartment of the double tank

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No one knows how much an orchard will really produce until it is carefully sprayed for a season. For example, consider the case of E. A. Wiegand, of Du Page County, Illinois, who last summer followed a recommended spray schedule and pruning instructions furnished by the state college of agriculture. He spent $66 for materials to spray his three-and-one-half-acre apple orchard five times. The result in cash returns was the sale of $1,300 worth of fruit right at his home.

Another result of this successful application of spray was the attendance of 117 farmers at a meeting and demonstration held by the state extension specialist near there this year. This large turnout led the extension worker to remark that "Money not only talks, but also convinces."

Electric Service

(*Continued from page* 16)

son home, let us enumerate the electric machinery, which is rereducing labor costs on the Nelson dairy farm:

Electrically driven bottle washer ..	½ h.p. motor
Electrically driven milking machine.	1 h.p. motor
Electrically driven water pump	¼ h.p. motor
Electrically driven bottle filler	¼ h.p. motor
Electrically driven standardizing vat	¼ h.p. motor
Total	2¼ h.p.

Forty-eight cows are milked on this farm by two men with a two-unit milking machine, and it takes them only 1 hour and 30 minutes. It requires three hours' time for the two men to milk the same herd by hand.

The table on page 16 will indicate how an annual saving of $897.00 is effected by the use of the milking machine.

The $897 saving in the annual expense of producing milk on the Nelson dairy is effected by the milking machine only; but the other electrically driven machines also make a material saving over older methods.

It is entirely a personal problem as to how electricity can serve us best. Its real value probably lies in the great variety of ways it can serve every one on the farm.

The important thing for every one concerned, including the farmers, the power companies, the manufacturers, and the agricultural experiment stations, is to realize what electricity can do for American agriculture, and then use it to the best advantage.

Grinding Feed for Profit

Reports of herd improvement associations indicate that farmers having herds which have been carefully culled and an abundance of home grown feed which can be ground and balanced with protein concentrate, are in the strongest position to make money. The March profits above feed cost for one herd in the Butler county, Iowa, association, are reported as $7.54 for each cow. This same month the average feed cost was $7.88, which includes ensilage and hay as well as grain. The ration fed consists of 500 pounds corn and cob meal, 500 pounds ground oats, 75 pounds cottonseed and 100 pounds of oilmeal.

The high herd of the Christian county, Illinois, association for March was fed alfalfa and soy bean hay, corn silage and a grain mixture composed of 400 pounds of corn and cob meal, 200 pounds of ground oats, 100 pounds of soy beans and 50 pounds of a 32 per cent dairy feed. This grade herd of 11 cows produced an average of 40.4 pounds of fat and also had the high cow of the association with a record of 2.4 pounds.

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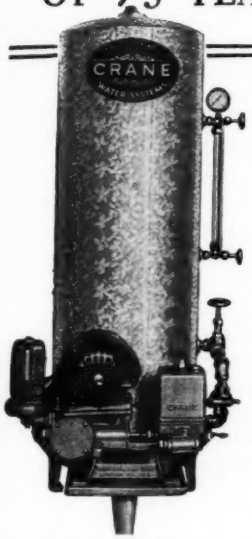

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Enjoy its benefits; the convenience of pure, fresh running water in the kitchen, bath, laundry and for car-washing or lawn and garden sprinkling; and the increased yield of farm produce. There is no need to be without this greatest of all necessities when the total cost is so small—and when it can be purchased so conveniently—only 10% down and a few dollars monthly. Other Crane Water Systems, proportionately low priced, can be had in all sizes and capacities.

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Being Weather Wise

"Whether it's cold or whether it's hot,
We're gonna have weather, whether or not,
The weather we get and the weather we've got
We're gonna have weather whether or not."

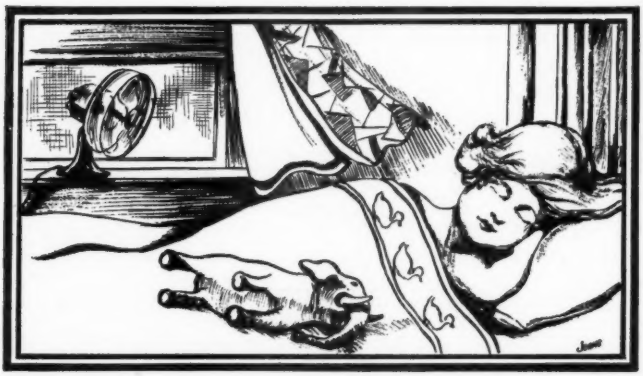
AND we are going to complain about it, too, which ever way the thermometer goes. But complaining is not half so effective as action when it comes to dealing with anything, weather included.

Getting up and plugging in an electric fan is one way of making ourselves comfortable when the weather we get is hot. Air that is rushing past our heads seems cooler than air that is standing still, whatever its temperature really is. Babies cannot put off nap time till it is cooler; nor can we postpone our nightly sleep till early frosts put a tang in the air. But fans start breezes any time of the day or night.

A fan is a ventilation system of sorts for a house, too. I guess we all believe that it is better to live in fresh air than stale. It is certainly pleasanter to breathe fresh air than air that has been breathed for hours on end. A fan stirs up housed air on still calm days when no wind comes through the open window to sweep the old air out and bring fresh air in.

If a fan can carry out smoke and steam from the kitchen before it settles on walls and woodwork, it puts the dates of washing and painting farther apart and that saves both labor and money, too.

If you are going shopping for a fan, you will be wise to study its construction carefully. You may want a bronze colored fan for the living room or a white enameled fan for the bedroom. Maybe you want an oscillating fan that will send its currents of air over a wide circle. Perhaps one whose breezes blow all in one direction will meet your needs. There is a wide variety to choose from. Some of them have vanes set before the blades to deflect the air and shut off drafts. But whatever its style it should be strong and sturdy. It should have a guard that will keep curtain ends from flapping against the blades. It should be quiet. Its



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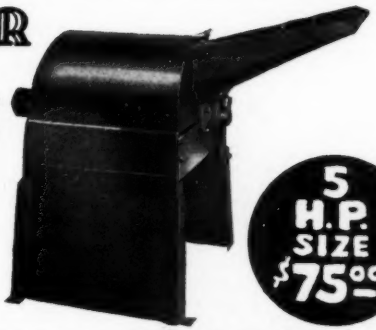

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motor should not make the radio scratchy.

If you want a fan especially for the kitchen, you will find them set in panels that fit right in the window opening. These fans work both ways. They blow the air out of the kitchen or they draw fresh air into the kitchen.

Running an electric fan costs about as much as burning an electric light. The motors varied from twenty to forty-five watts in a group of fans I examined lately.

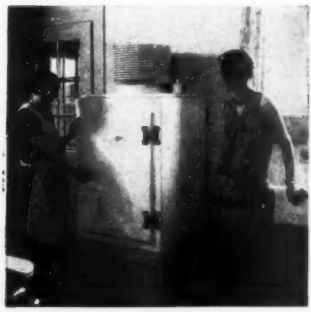
Perhaps our houses will be piped for cold fresh air some day. If we only realize it, they are wired for it now.

* * *

Salads — the Common or Garden Variety

IF you make it substantial enough to stick to your ribs, a salad is a supper for any hot night. Moreover it is often a supper you can get pretty largely in the morning while it is cool.

Most everything that grows in your garden might help make a salad. In fact, about this time of year I find it profitable to go out and hang over the top rail of the garden fence just to look up and down the rows for awhile. I view them then not with the complacent pride of a gardener, but with the eye of one who plans the meals. That sometimes gives me some new ideas for the salads growing there.



Put the salad in the refrigerator in the morning. It will be crisp and cold for supper time.

Of course, successful salads do not grow by themselves, not by any means. Nor can they be thrown together haphazard if they are to be a success, which for a salad, means getting itself eaten.

Salads are tricky foods. When we make them of garden sass, they contribute very essential vitamines, mineral salts, and bulk to our diet. But we cannot fall back on their food value and try to depend on the theory that "handsome is as handsome does" for the salads we serve. They have to look nice to beguile folks to eat them. Beauty in a salad demands bright colors or contrasting colors.

Like everything else going down the red lane, a salad has to taste good, too. That means it must be carefully seasoned. Salt, a hint of onion, and a good tart salad dressing accomplish this. If it is mixed with salad dressing, every particle of food should have some of the dressing on it. There must not be dry spots to spoil the taste. And above all else the greens must be crisp and the whole thing cold. A wilted bedraggled salad might just as well trot right back to the kitchen for all the good it will do on the table.

Here is a salad that can be made up in the morning and set away in a covered dish in the refrigerator to get good and cold by night.

> One half cup each of cooked and diced carrots, turnips, potatoes, beets, cauliflower. One half cup peas, string beans, celery. Season well with salt and paprika. Mix with one half cup salad dressing. Serve on crisp, fresh lettuce.

This is a good supper salad you can make in the morning, but it does need some help from the pantry shelves:

> One can of salmon, flaked. 2 cups of chopped cabbage, ½ cup of sweet pickles, 4 cooked eggs. Mix two of the eggs, chopped fine, with the cabbage, pickles and salmon. Season with lots of salt. Mix the salad dressing in lightly. Pack the salad in a covered dish lined with lettuce. Then

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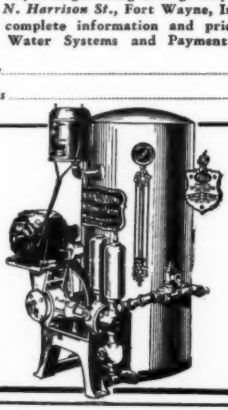

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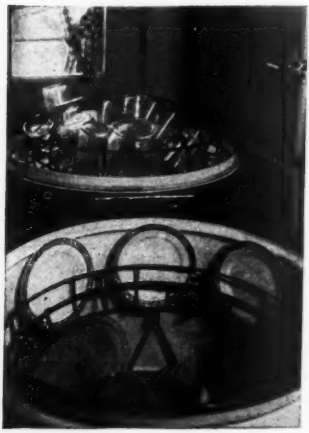
if you want the salad to be particularly decorative, chop the whites of the other two eggs fairly fine. Put the yolks through a coarse wire strainer. Pile both on top of the salad, and dust with paprika.

These two salads are not really substantial enough to be meals in themselves, but they furnish the vegetables for hot nights.

For one you grate three carrots or put them through the food chopper. Mix them with minced parsley in amounts to suit your own taste. Season with salt and paprika, moisten with salad dressing and chill before you serve it on lettuce. The other is made with onions and radishes. Peel a large mild onion. Slice it and separate the rings. Let it stand in ice water until crisp. Dry it and pile the rings on a nest of lettuce hearts or shredded lettuce. Sprinkle it generously with radishes chopped with the skin on. Salt it and add a dab of salad dressing.

As far as I'm concerned, many is the night this salad and bread and butter, a dish of berries, a cookie and a glass of milk would seem quite food enough. But I like radishes and onions.

* * *



The dishes are assembled in the dishwasher for a quick, thorough cleansing

Doing Dishes

I HAVE known women who say that they really enjoy washing dishes. And, I have known others who do not. But no matter how they feel about it, it is one of those things that just has to be done in this business of keeping house. Some one with a taste for figures has reminded us that somebody is washing dishes in American homes sixty-six million times a day. And some one else of more curious turn of mind has discovered from a fairly wide survey that the average pile of dishes has fifty-five separate pieces stacked up for cleansing.

And yet it is only recently that women have begun to consider that the whole job might as well be done with machinery.

There are many things to say in favor of machines. It is easier to keep them clean, than it is to keep dishcloths and towels sweet and sanitary. It is possible to use far hotter water in a machine than you can use in a dishpan where your hands must govern the temperature, and hot water is a powerful agent for cleanliness. A machine does the work quicker.

Selecting a machine demands careful thoughts. Obviously taking care of the machine must not take more work than doing the dishes in the first place. It must be easy to clean. If it is not built into the sink, it must be convenient to fill and empty. The contents must be handy to reach.

I went out into the kitchen with a friend the other day and discovered that she had a new dishwasher. It is a round tub-like affair with three legs, and an underslung motor. The legs have big casters so the machine rolls easily. It looks very much like a washing machine, but when you push back the cover—and, you do not lift it off, it turns back on a heavy hinge—you know it is not for clothes for it is full of racks. The top rack is for cups and glasses and serving dishes; the second for plates and saucers, and silver. In the very bottom of the machine are

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4 SIZES, 100 TO 650 CHICK CAPACITY
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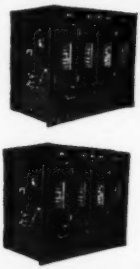

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(Inside Back Cover).

Front Cover Title Contest

First Prize for June—$25.00
"Happy Modern Bride, With Gifts Electrified"
Mrs. Joe Hermstad, R. 2, Luck, Wis.

The following titles have been selected as the winners of the $5 cash prizes:

"Better than jewels bedecking the bride, Is the modern home electrified," B. F. Young, Ozona, Fla.

"The modern bride hails with delight, Gifts that will make her housework light," Mary MacDonald, R. 2, Swayzee, Ind.

"Happy is the bride whose gifts are electrified," Katherine Goelzer, Oakwood, Wis.

"The bride's conception of 'an electrical shower'," Mrs. Samuel Garber, R. 1, Roaring Spring, Pa.

"With electricity to keep drudgery out of her new life, The blushing bride becomes a happy housewife," Myra L. Barnhart, R. 2, Menomonie, Wis.

Rules for August Contest

A cash prize of $25.00 will be awarded for the best title to the front cover illustration.

In addition we will pay $5.00 for each of five titles given honorable mention.

In case of a tie, each winning contestant will receive the ful cash prize to which he or she is entitled.

The winners will be announced in the October issue.

Only the farmers or members of the farm family, to whom this magazine was sent, are eligible.

One title only may be submitted.

Use the form below or write your answers on a plain sheet of paper in similar form.

Be sure to answer questions (a) and (b).

Write plainly and send your suggestion to the Title Editor, ELECTRICITY ON THE FARM. 24 W. 40th St., New York, before September 1.

My title for August Front cover picture is.....

.....

.....

.....

.....

.....

(a) About how much did electric light and power cost you for the year 1929? $.....

(b) Have you a telephone?.....

Name..... R. F. D.....

Post Office..... State.....

.....

paddles that look a little like the blades of a fan.

There is a long adjustable arm with a wide mouth to use in filling and emptying the machine. The mouth turns up under the faucet to catch the water; it turns down when a pump in the machine drives it out. So emptying or filling is no job even though the dishwasher is not connected to the plumbing.

"Do you like it, Fern?" I asked after we had gone over every detail of the machine.

"I do indeed. There are two of me in this kitchen at dishwashing time nowadays. And neither of us is standing for half an hour with our hands in greasy dishwater either."

"Does it actually save a lot of work?" I asked as though I were really skeptical about it.

"It does," she replied firmly, "and time—a third—sometimes half of the time. Of course, I've had to change my routine a little. The adoption of any new piece of machinery for housekeeping demands that. When I bring the dishes from the table, I scrape them and pile them directly in the trays. I put the silver in the tray with the handles down; the cups, bowls and glasses in the top tray upside down. Some folks say to put the glasses in only during the rinse, but I put mine in to be washed too.

"Then I put in some water softener and a little soap powder—not too much. Next I turn the funnel arm under the faucet and run in hot water 'till the gauge on the side of the machine says enough."

"How much is that?" I asked.

"I've never measured," she replied, "but the folder of directions said that a machine of this size, one that will wash from forty to sixty dishes and forty pieces of silverware at one time, takes about five and a half quarts of water. Then I run the machine five or six minutes. During this time I wash the pans and kettles. You know I generally wash as I go when I am getting a meal, so there are not many. They can be washed in the machine if nothing has burned on, but I get them done while the others are washed. So I come out even. When I turn this handle the machine empties itself by pumping the dirty dishwater back into the sink."

"How about the rinsing?" I inquired.

"I put in a quart or two and run the machine a minute to rinse off

(*Continued on page* 48)

The Easy Way—the Electric Dishwasher

STOVER

Electric Pump Jack

Brings Your Old Pump Up-to-date

Strong, rugged, built for heavy duty work. Fits any size pump. Arms designed for upright lift, with no side thrust. Belt driven from motor—a safety feature which eliminates breakage of jack or burning out of motor in case of a frozen pump.

Runs In Oil!

Gears, pinions, eccentric arms and bearings run in oil bath, in leak-proof reservoir.

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for women or children because Fords Milker Method makes possible simple, yet durable construction. Fewer parts make it easier to clean thoroughly. No long pipe line to get contaminated. Produces higher quality, higher priced milk. Cows like it—give freely. Easy to operate. Completely guaranteed, thousands in use. Models for any barn condition.

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Master Electric Co.
DAYTON — OHIO

Questions and Answers

Conducted by H. J. GALLAGHER
Agricultural Engineering Dept.
Michigan State College

Note—Readers are invited to send in questions which will be answered in the order received. Names are omitted from questions unless otherwise specified.

Question: *My five horsepower electric motor does not seem to have the power it used to, or run as fast as it should. Where should I look for trouble under this condition?*

Answer: When a motor seems weak and runs slow any one or more of the following reasons may be the cause:

1. Motor connected to the wrong power circuits.
2. Overloaded motor.
3. Poor contacts or connections.
4. Too low voltage at motor terminals.
5. Motor windings damaged.

1. Be sure the motor is connected to the right power service.

2. Check the speed of the motor without load and examine the bearings for tightness and lubrication.

3. Check all connections at the main switch and auxiliary switches. Fibre and other insulation on switches and terminals occasionally shrink and cause poor contacts. Clean the commutator and see that the brushes are free in the holders.

4. To determine low voltage of service to meter apply a voltmeter on the power side of the fuse clips, then use a voltmeter on motor terminals. If live voltage is low, report to the power company. If service line to motor shows low voltage, rewire the circuit with larger wire.

5. To determine whether the motor windings are damaged generally calls for the service of an electrician.

H. J. GALLAGHER

Question: *What speed should an ensilage cutter, knives removed, run to blow grain 36 feet from the threshing machine to the granary? My neighbor handled his that way last year but too much of the grain was cracked to suit me.*

Answer: In all probability the machine you refer to was operated too fast. It is not necessary that all of the grain as dumped from the weighter on the threshing machine be forced through the blower at once as many farmers seem to think. A blower speed of 400—500 r. p. m. Will convey grain slow enough to cause little if any injury yet fast enough to keep up with the threshing machine. Adjust the hopper opening so that the grain will flow uniformly into the blower only fast enough to empty the hopper as the grain is dumped from the thresher.

* * *

Doing Dishes

(*Continued from page* 46)

the soap. Then I pump that water off and fill the machine up to the gauge again with very hot water for scalding. I only run it about a minute then. When I turn the cover back, the air dries them in a jiffy. I wipe the silver and give a little polish to the glasses, but the china is ready to put away, as clean and dry as a bone."

There are those who say that dishwashing might just as well be a once-a-day job, because dishes can be put in the machine in the morning and washed quite easily at night.

SMITH ELECTRICS

52,000 Eggs *30,000 Eggs*

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FIRST in performance, results and quality chicks. Lowest in current consumption and cost of operation—highest in profits. The outstanding incubator of today.

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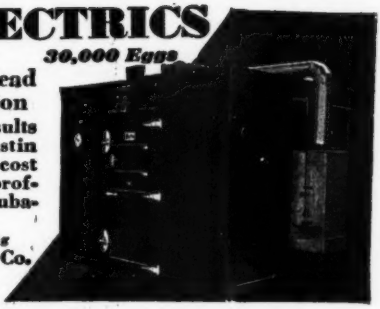

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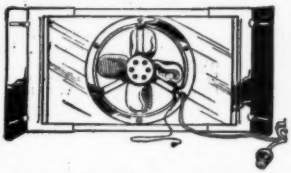

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Don't Overlook Page 51
(Inside Back Cover)

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The One-Man, One Hand Clipper

No stands, trolleys or cables. Clips udders, flanks, 8 to 12 cows an hour. Satisfaction guaranteed. See dealer or write for full description and special offer.

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FOR 1 OR 1000 COWS

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Electrically operated separators and milkers produce greater profits and a better product.

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Honestly, I don't see how on earth we ever managed to get along without our electric iron. It's not a luxury—it's a necessity.

Isn't there a difference between inserting the plug, pressing a button and waiting a few seconds, and hunting up the little old flatirons, setting them on the stove and praying for the best if one was in a hurry and the fire was low? This is the age of speed and electricity.

It is wonderful to have a servant, faithful and seldom ill, to help out every week.

Miss Florence Brown,
Brush Prairie, Wash.

Electrical Servant

Not until I had installed an electric pump for an automatic water system did I realize the full meaning of the words "Electrical Servant." This pump enables me to have running water at my beck and call, whether it be in the kitchen, bathroom, barn or chicken houses. It is the means of carrying my water wherever and whenever it is needed. The electric water system has driven away drudgery on our farm, replacing it with convenience and pleasure, and is our faithful servant throughout the year.

Edna Wieland,
R. F. D. 2, Box 65,
Kingston, N. Y.

Rub-a-dub-dub

To rub-weary women, gone the long mornings of rushing—one eye on the clock, two hands in a tub. With soapsuds and song I turn on the current and watch the electric do "Rub-a-dub-dub."

In the field the husband whistles. He's sure of a dinner—a real one—on time. It will be served with smiles instead of a backache. He grins at a sleeve covered with grime.

Daughter who slipped in the mud hurries homeward. No need for lingering with fear. Smiling mother supplies a fresh apron. Home's a new place since the washer is here.

Mrs. Florence Beske,
Stratford, Wis.

'Lectric Refrig

In the night my husband used to call—
Oh Louise! Louise!
Send for the Doctor, please,
I've eaten some cheese
Kept above fifty degrees;
I've a fierce pain in my tummy,
Which isn't so funny.
It seems all up in a ridge.
So without delay,
Go right away
And buy an electric refrig.
Now with food bills so small
And no Doctor to call
We've paid for our 'Lectric Refrig.'

Mrs. Jessie Evans,
Hunkers, Westmoreland Co., Pa.

Goal of Progress

Our electric pump on the stock well has been the goal in our progress since the days when we drove the cattle to the creek more than a mile away. It is a decided contrast to the uncertainty of the windmill. It is a welcome change from the dirt and expense of the gasoline engine.

It is a source of real satisfaction to know that a problem which has always been such a bugaboo on the livestock farm is so efficiently and economically handled by this faithful servant.

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